pack can be reported by means of a method of only collecting the charging and discharging quantities of the Main battery. Alternatively, an electricity meter is built in each battery to collect the electric quantity of each battery so as to determine the total electric quantity of the battery pack. Subsequently, after the total electric quantity of the battery pack is determined, the obtained total electric quantity is compared with the total electric quantity of the battery pack under the circumstance of no damaged battery exists in the battery pack. If the twice total electric quantities of the battery pack differs much, it can be determined that the battery in the battery pack is damaged.

[0047] By means of the battery voltage-multiplying charging circuit of this embodiment of the present disclosure, during quick charging, the main battery and each second battery are switched to the series connection state, and the high voltage charging unit provides a multiplied voltage, namely a voltage higher than the existing common charging voltage by several times, for charging. By means of the method of charging with the multiplied voltage, the charging speed of the battery pack can be increased. Additionally, as the batteries in the battery pack are connected in series, the value of the current flowing through each battery still cannot be increased in spite of the improvement of the charging voltage, and therefore, it may not result in the issue of battery heating due to overhigh current flowing through the batteries. It thus can be seen that the battery voltage-multiplying charging circuit provided by this embodiment of the present disclosure is capable of effectively solving the issue of battery heating due to the increase of the current flowing through the battery bodies while providing quick charging for the batteries.

[0048] Another embodiment of the present disclosure also sets forth a mobile terminal. The mobile terminal includes the battery voltage-multiplying charging circuit set forth in the present disclosure. The specific arrangement position of the circuit in the mobile terminal may be set by a person skilled in the art according to actual requirements, which is not described redundantly in the embodiment of the present disclosure.

[0049] The battery voltage-multiplying charging circuit provided by the embodiment of the present disclosure includes a charging port, a high voltage charging unit, a low voltage charging unit, a battery pack, and a system, wherein the battery pack includes a main battery and at least one secondary battery; the high voltage charging unit and the low voltage charging unit are connected with the charging port, respectively, and the low voltage charging unit is connected with the system and the battery pack, respectively; the high voltage charging unit is connected with the battery pack.

[0050] During quick charging, the main battery and each second battery are switched to a series connection state, a charging voltage is transmitted to the high voltage charging unit and the low voltage charging unit via the charging port, and the high voltage charging unit charges the main battery and each second battery. Meanwhile, the low voltage charging unit supplies power to the system, when charging is completed, the main battery and each second battery are switched to a parallel connection state to supply power to the system.

[0051] Preferably, the battery pack in the battery voltage-multiplying charging circuit included in the mobile terminal only includes one second battery. A first switch is arranged between a positive electrode of the second battery, and a positive electrode of the high voltage charging unit as well as a positive electrode of the low voltage charging unit. A second switch is arranged between a negative electrode of the second battery, and a positive electrode of the main battery as well as a negative electrode of the main battery. The negative electrode of the main battery is connected with a negative electrode of the high voltage charging unit, and a negative electrode of the low voltage charging unit; a third switch is arranged between the positive electrode of the main battery and the positive electrode of the low voltage charging unit.

[0052] Preferably, during quick charging, the first switch is adjusted to switch on the positive electrode of the second battery with the positive electrode of the high voltage charging unit, the second switch is adjusted to switch on the negative electrode of the second battery with the positive electrode of the main battery, and the third switch is adjusted to switch on the positive electrode of the main battery with the positive electrode of the low voltage charging unit.

[0053] Preferably, during conventional charging, the first switch is adjusted to switch the positive electrode of the second battery with the positive electrode of the low voltage charging unit, the second switch is adjusted to switch the negative electrode of the second battery with the negative electrode of the main battery, and the third switch is adjusted to switch the positive electrode of the main battery with the positive electrode of the low voltage charging unit.

[0054] Preferably, in the battery voltage-multiplying charging circuit, a triode is arranged between the positive electrode of the main battery and the positive electrode of the low voltage charging unit, and connected in parallel with the third switch.

[0055] With respect to the specific structure of the battery voltage-multiplying charging circuit included in the mobile terminal, see the battery voltage-multiplying charging circuit in the first embodiment and the second embodiment, which is not redundantly described herein.

[0056] The device embodiment described above is merely exemplary, wherein units described as separate parts may be or not separated physically, and parts displayed as units may be or not physical units, which may be located at the same place, or may also be distributed on a plurality of network units. Partial or all modules therein may be selected according to actual requirements to achieve the objectives of the solutions of the present embodiment. The solutions can be understood and implemented by a person ordinarily skilled in the art without creative labor.

[0057] According to the descriptions of the above embodiments, it can be clearly understood by a person skilled in the art that each embodiment can be implemented by means of software and necessary universal hardware platform of course, hardware may also be possible. On the basis of such understanding, the technical solutions in nature or parts thereof contributing to the prior art may be embodied in the form of a software product. The software product can be stored in a computer readable storage medium, such as ROM/RAM, a magnetic disk, an optical disk, and the like, and includes a plurality of instructions to enable a computer device (which may be a personal computer, a server, a network device, or the like) to execute the method described in each embodiment or some parts of the embodiments.

[0058] It should be noted at last that the above embodiments are merely meant to illustrate the technical solutions